EAST AFRICAN SCHOOL OF AVIATION EXAMINATION

DIPLOMA IN AERONAUTICAL ENGINEERING AVIONICS

MEASUREMENT TECHNOLOGY

STREAM: MODULE2 **AvionicsDuration:3.00 HRS**

DATE: 10/04/2017 **TIME: 9:00-12:00PM**

INSTRUCTION TO CANDIDATES

1. *This paper consists of **THREE (3**) printed pages*
2. *You should have the following for this examination:*

   Mathematical tables/

   Electronic calculator.

3. *Answer any FIVE questions*

1(a) (i) Describe measurement and explain how the result of measurement is expressed. **(6 Marks)**

(ii) Explain a measuring standard in accordance with measurement **(2 marks)**

(iii) Outline two characteristic performance of measurement **(2 marks)**

(b)(i) Define measuring lag and explain two types of the lag. **(3 marks)**

(ii) State loading effect and describe the three stages which a measurement system consists of. **(7 marks)**

2 (a) With a well labeled diagram show how an eddy current tachometer works and state two disadvantages of a linear velocity measurement **(7 marks)**

(b) State three types of errors in measurement and explain the meaning of each type of error **(3 marks)**

(c) State five components that are found in an eddy current tachometer. **(10 marks)**

3(a)(i) Name the importance of static characteristics of measurement systems. **(2 marks)**

(ii) Define resolution in terms of measurement **(2 marks)**

(iii) Explain reading correction and state how it is related to absolute error. **(2 marks)**

(iv) Outline absolute error of measurement. **(2 marks)**

(v) State relative error and show how it can be expressed. **(2 marks)**

(b) (i) Explain the difference between accuracy and precision. **(5 marks)**

(ii) Name the categories of static errors. **(5 marks)**

4(a) Define how the performance characteristics of instrument systems are judged**. (6 marks)**

(b) State what is tolerance and explain where it falls in the characteristics of measurement **(4 marks)**

(c) With a well labeled diagram show how an AC generator tachometer is used to measure speed. **(10 marks).**

5(a) Write down five dynamic characteristics and define the meaning of each characteristic.

(b) Explain how the effect of random errors can be minimized. **(6 marks).**

(c) Outline the difference between environmental error and observational error. **(4 marks)**

6(a) By a use of a formula show how relative error can be quoted as a fraction . **(6 marks)**

(b) Determine the relative error of a capacitor whose measured value is 205.3μF and its true value is 201.4μF. **(14 marks)**

7(a) Explain what is reading correction and state how it is related to absolute error**.(5 marks)**

(b) State the term resolution and ex plain how it can be expressed. **(3 marks)**
(c) Describe the meaning of limiting error. **(2 marks)**
(d)(i) Name the categories of static errors **(6 marks)**
(ii) Explain what is measurand and state what is required in it. **(4 marks)**

8 (a) Name six types of tachometers and explain the difference between angular velocity measurement and linear velocity measurement. **(20 marks)**